

**Kentucky Department of Education, Division of Career and Technical Education
Curriculum Document**

Program Area: Agricultural Education

Class: AGRISCIENCE

Text: *Agriscience 3rd Ed.*, Interstate, Lee & Turner, 2003

Date Revised: Fall, 2003

Agriscience

Course Description: Agriscience introduces the scientific agricultural approach to animal science and selection, and plant and land science. Agricultural career opportunities will be emphasized in each class. Laboratory experiences relating to basic and current technology will be part of the program. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program and keep appropriate records.

Academic Expectations	Content/Process
	<p>Students will</p> <ul style="list-style-type: none"> • 1.1, 2.1, 2.2, 2.3, 2.5, 2.6 apply basic chemical and biological concepts to the production of food, including the interrelationships between soil and plants and the natural cycles which sustain all ecosystems. • 2.1, 2.3, 2.6 apply basic physiological and genetic principles to animal production systems. • 2.1, 2.2, 2.3, 2.6 investigate the impact of human activities on the environment and resource conservation and stewardship and interpret the impact of globalization on agriculture. • 2.20, 2.6, 2.19 examine the application of technology and genetic engineering in modern agriculture systems. • 1.11, 2.13, 2.18 maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions. • 1.12, 2.16, 2.37 utilize activities of FFA as an integral component of course content and leadership development.

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1.9, 1.10, 1.12	<ul style="list-style-type: none">• apply science, math and communication skills within the technical content.• demonstrate employability and social skills relative to the career cluster.
1.1, 2.36, 2.38	
Connections <ul style="list-style-type: none">• Kentucky Occupational Skill Standards• Secretary’s Commission on Achieving Necessary Skills (SCANS)	

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Academic Expectations:

- 1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.
- 1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems.
- 1.10 Students organize information through development and use of classification rules and systems.
- 1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.
- 1.12 Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.
- 2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.
- 2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.
- 2.3 Students identify and analyze systems and the ways their components work together or affect each other.
- 2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance.
- 2.6 Students understand how living and nonliving things change over time and the factors that influence the changes.
- 2.13 Students understand and appropriately use statistics and probability.
- 2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.
- 2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.
- 2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.
- 2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.
- 2.36 Students use strategies for choosing and preparing for a career.
- 2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.

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2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other post-secondary training or to get a job.

Skills Standards: See Attachment

Core Content:

SC-H-2.2.1 Earth is a system containing essentially a fixed amount of each stable chemical atom or element. Each element can exist in several different reservoirs. Each element on Earth moves among reservoirs in the solid Earth, oceans, atmosphere, and organisms as part of geochemical cycles.

SC-H-2.2.2 Movement of matter between reservoirs is driven by Earth's internal and external sources of energy. These movements are often accompanied by a change in physical and chemical properties of the matter. Carbon, for example, occurs in carbonate rocks such as limestone, in the atmosphere as carbon dioxide gas, in water as dissolved carbon dioxide, and in all organisms as complex molecules that control the chemistry of life.

SC-H-3.1.2 Cells have particular structures that underlie their function. Every cell is surrounded by a membrane that separates it from the outside world. Inside the cell is a concentrated mixture of thousands of different molecules that form a variety of specialized structures. These structures carry out specific cell functions.

SC-H-3.1.3 Most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by a large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell.

SC-H-3.1.3 Cells store and use information to guide their functions. The genetic information stored in DNA directs the synthesis of the thousands of proteins that each cell requires.

SC-H-3.1.4 Cell functions are regulated. Regulation occurs both through changes in the activity of the functions performed by proteins and through selective expression of individual genes. This regulation allows cells to respond to their internal and external environments and to control and coordinate cell growth and division.

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SC-H-3.1.5 Plant cells contain chloroplasts, the site of photosynthesis. Plants and many microorganisms (e.g., *Euglena*) use solar energy to combine molecules of carbon dioxide and water into complex, energy-rich organic compounds and release oxygen to the environment. This process of photosynthesis provides a vital link between the Sun and energy needs of living systems.

SC-H-3.1.6 In the development of multicellular organisms, cells multiply and differentiate to form many specialized cells, tissues, and organs. This differentiation is regulated through the expression of different genes.

SC-H-3.2.1 Multicellular animals have nervous systems that generate behavior. Nerve cells communicate with each other by secreting specific molecules. Specialized cells in sense organs detect light, sound, and specific chemicals enabling animals to monitor what is going on in the world around them.

SC-H-3.2.2 Behavioral responses to internal changes and external stimuli can be innate or learned. Responses to external stimuli can result from interactions with the organism's own species and/or other species, as well as environmental changes.

SC-H-3.2.3 The broad patterns of behavior exhibited by organisms have changed over time through natural selection to ensure reproductive success. Organisms often live in unpredictable environments, so their behavioral responses must be flexible enough to deal with uncertainty and change. Behaviors often have an adaptive logic.

SC-H-3.3.1 Multicellular organisms, including humans, form from cells that contain two copies of each chromosome. This explains many features of heredity. Transmission of genetic information through sexual reproduction to offspring occurs when male and female gametes that contain only one representative from each chromosome pair unite.

SC-H-3.3.2 Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring.

SC-H-3.4.1 Species change over time. Biological change over time is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) natural selection. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms.

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SC-H-3.4.2 The great diversity of organisms is the result of more than 3.5 billion years of biological change over time that has filled every available niche with life forms. The millions of different species of plants, animals, and microorganisms that live on Earth today are related by descent from common ancestors.

SC-H-3.4.3 Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships. Different species are classified by the comparison and analysis of their internal and external structures and the similarity of their chemical processes.

SC-H-3.5.1 Atoms (e.g., carbon, nitrogen) and molecules (e.g., water) cycle among the living and nonliving components of the biosphere.

SC-H-3.5.2 Energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers.

SC-H-3.5.3 Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.

SC-H-3.5.5 Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected.

SC-H-3.6.1 Living systems require a continuous input of energy to maintain their chemical and physical organization since the universal tendency is toward more disorganized states. The energy for life primarily derives from the Sun. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing molecules. These molecules can be used to assemble larger molecules (e.g., DNA, proteins, sugars, fats). In addition, the energy stored in the bonds between the atoms can be used as sources of energy for life processes.

SC-H-3.6.2 The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Cells usually store this energy temporarily in the phosphate bonds of ATP. During the process of cellular respiration, some energy is lost as heat.

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SC-H-3.6.3 As matter and energy flow through different organizational levels (e.g., cells, organs, organisms, communities) and between living systems and the physical environment; chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change.

MA-H-1.2.1 Students will perform addition, subtraction, multiplication, and division with real numbers in problem-solving situations to specified accuracy.

MA-H-2.1.4 Students will describe properties of, define, give examples of, and apply to both real-world and mathematical situations ratio measures including slope and rate.

SCANS: (Workplace Skills). Secretary's Commission on Achieving Necessary Skills

Competencies

Resources: Identifies, organizes, plans, and allocates resources.

C3 Material and Facilities – Acquires, stores, allocates, and uses materials or space efficiently.

Information: Acquires and uses information.

C5 Acquires and evaluates information.

C6 Organizes and maintains information.

C7 Interprets and communicates information.

C8 Uses computers to process information.

Interpersonal: Works with others.

C9 Participates – Contributes to group effort.

C10 Teaches Others.

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Technology: Works with a variety of technologies.

Resources: Identifies, organizes, plans, and allocates resources.

C18 Selects Technology – Chooses procedures, tools or equipment including computers and related technologies.

C19 Applies Technology to Task – Understands overall intent and proper procedure for setup and operation of equipment.

C20 Maintains and Troubleshoots Technology - Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Foundation Skills

Reads, writes, performs arithmetic and mathematical operations, listens and speaks.

F1 Reading – Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.

F2 Writing – Communicates thoughts, ideas, information, and messages in writing; and relates documents such as letters, directions, manuals, reports, graphs, and flow charts.

F3 Arithmetic – Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.

F4 Mathematics – Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.

F5 Listening – Receives, attends to, interprets, and responds to verbal messages and other cues.

F6 Speaking – Organizes ideas and communicates orally.

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons.

Systems: Understands complex interrelationships.

F7 Creative Thinking – Generates new ideas.

F8 Decision Making – Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.

F9 Problem Solving – Recognizes problems and devises and implements plan of action.

F10 Seeing Things in the Minds Eye –Organizes, and processes symbols, pictures, graphs, objects, and other modifications to existing systems and information.

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F11 Knowing How to Learn – Uses efficient learning techniques to acquire and apply new knowledge and skills.

F12 Reasoning – Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

F13 Responsibility – Exerts a high level of effort and perseveres towards goal attainment.

F14 Self-Esteem – Believes in own self-worth and maintains a positive view of self.

F15 Sociability – Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.

F16 Self-Management – Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.

F17 Integrity/Honestly – Chooses ethical courses of action.

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Technical Content (Agri- culture topics of instruc- tion)	Ag Ed Programs of Studies “Content/ Process Statements”	Alignment to: Core Content, Academic Expectation s, Skills Standards & SCANS	Teacher Activities Instructional Activities (See Transformations)	Learner Activities “Students will be able to...” statements (Use Bloom’s Taxonomy)	Types of Assessment (See Transformations)	Resources	Length of Instructi onal Time

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Intro to Ag Science and Tech.	Apply basic chemical and biological concepts to the production of food, including the interrelationships between soil and plants and the natural cycles, which sustain all ecosystems.	Academic Expec. 1.1, 2.1, 2.2, 2.3, 2.5, 2.6 Core Content SC-H-2.2.1, 2.2.2, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 3.2.1, 3.2.2, 3.2.3, 3.3.2, 3.3.3, 3.4.1, 3.4.2, 3.4.3, 3.5.1, 3.5.2, 3.5.3, 3.5.5, 3.6.1, 3.6.2, 3.6.3, MA-H-1.2.1, 2.1.4 SCANS (Utilizes all listed	<u>Part One</u> Chapter 1: Meeting human needs Define terms for the chapter Complete the end of chapter review questions.	<ol style="list-style-type: none">1. Explain 3 basic human needs2. Discuss major events in Ag history3. List and Describe 3 areas of Ag industry4. Relate areas of Agriscience that makes life better5. Assess the role of consumers6. Contrast world ag practices	Unit One Exam will cover part one, Chapters 1 & 2. Handouts on plant parts, nutrients, and wood products will be utilized. Handouts on Plant and Animal Production	Textbook Power Point Presentation on Food, Fiber, and Shelter	3 Days	
Food			Chapter 2: Using science and Technology Define terms for the chapter Complete the end of chapter review questions.	Chapter 2: Using science and Technology Define terms for the chapter Complete the end of chapter review questions.	Explain Agriscience and technology	Textbook		
Nutrient					Relate Agriscience and technology to 4 areas of science			
Plant Parts					List and explain common areas of Agriscience			
Animal Prod.					Explain the scientific method and its use in research			
					ID emerging tech in ag			

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<p>Demonstrate employability and social skills relative to the career cluster.</p> <p>Maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.</p> <p>Utilize activities of FFA as an integral component of course content and leadership development.</p>	1.1, 2.36, 2.38	<p><u>Part Two</u></p> <p>Chapter 3: Advancing in Agriscience</p> <p>Define terms for the chapter</p> <p>Complete the end of chapter review questions.</p>	<p>Identify career and entrepreneurship opportunities in Agriscience</p> <p>Develop appropriate interpersonal skills</p> <p>Describe safety practices in Agriscience</p> <p>Demonstrate appropriate citizenship</p> <p>Locate, assess, and use information in Agriscience</p>	<p>Unit Two Exam will cover part one, Chapters 3 & 4.</p> <p>Career Inventory Survey</p> <p>Internet search</p>	<p>Textbook</p> <p>FFA Manual</p> <p>FFA Student Handbook</p> <p>www.ffa.org</p> <p>FFA videos</p> <p>Guest Speaker</p>	4 Days
	1.11, 2.13, 2.18	<p>Chapter 4: Learning in Agriscience</p> <p>Define terms for the chapter</p> <p>Complete the end of chapter review questions.</p>	<p>Explain Ag Education</p> <p>Understand SAE programs</p> <p>Manage SAE programs</p> <p>Trace the history, purpose, and nature of the FFA</p> <p>Describe the organizational structure, keys to success, and common awards and events found in local FFA Chapters</p>			
	1.12, 2.16, 2.37					

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	<p>Investigate the impact of human activities on the environment and resource conservation and stewardship and interpret the impact of globalization on agriculture</p>	<p>1.1, 2.1, 2.2, 2.3, 2.5, 2.6</p>	<p><u>Part Three</u> Chapter 5: Using natural resources</p> <p>Define terms for the chapter Complete the end of chapter review questions.</p>	<p>Explain sustainable use of environmental and natural resources</p> <p>Describe the role of ecosystems</p> <p>List examples of natural resources</p> <p>Discuss pollution and sources</p> <p>Examine methods of waste disposal including composting</p>	<p>Unit Two Exam will cover part one, Chapters 5, 6, & 7.</p>	<p>Textbook</p>	
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	Examine the application of technology and genetic engineering in modern agriculture systems	2.20 2.6 2.19	Chapter 6: Determining the basis of life Define terms for the chapter Complete the end of chapter review questions.	Explain the important characteristics of organisms Explain the meaning of life span and its stages Discuss the processes of living organisms Describe the structural bases of living organisms ID cell growth processes Discuss the role of heredity and genetics			
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	Apply science, math and communication skills within the technical content.	1.9, 1.10, 1.12	Chapter 7: Classifying and naming living things Define terms for the chapter	Describe the classification system for living things Explain scientific names and match scientific names with the common names of selected species Name and discuss the five kingdoms of organisms Properly identify the following: Kingdom Phylum Class Order Family Genus Species			
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	Apply basic physiological and genetic principles to animal and plant production systems.	2.1, 2.3, 2.6	<u>Part Four</u> Chapter 8: Applying plant science Chapter 9: Reproducing plants	Describe how plants are adapted to climate Explain plant life cycles Identify the major vegetative parts of plants and discuss their functions Explain the meaning and kinds of tropisms Explain plant reproduction ID and explain kinds & parts of seeds and flowers Describe germination and the needed conditions Explain uses of vegetative propagation Explain the importance of seed variety and quality			
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			Chapter 10: Producing plants	Describe how plants grow and the conditions needed for growth Explain photosynthesis and why it is important Explain transpiration and why it is important Name the nutrients plants need and describe how plants get them Describe nitrogen fixation in legumes Explain the use of fertilizer			
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			<u>Part Five</u> Chapter 12: Applying animal science Chapter 13: Feeding animals Chapter 14: Breeding animals <u>Part Six</u> Chapter 16: Using biotechnology				
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	Investigate the impact of human activities on the environment and resource conservation and stewardship and interpret the impact of globalization on agriculture.	2.1, 2.2, 2.3, 2.6	<u>Part Seven</u> Chapter 17: Applying earth science Chapter 18: Applying soil science <u>Part Eight</u> Chapter 19: Applying chemistry in Agriscience Chapter 20: Applying physics in Agriscience				
	Examine the application of technology and genetic engineering in modern agriculture systems.	2.20, 2.6, 2.19	<u>Part Nine</u> Chapter 21: Marketing technology in Agriscience Chapter 22: Processing technology				

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Advanced Animal Science

Course Description: A freshman-level college course which introduces students to a survey of genetics, reproductive physiology, growth and development, nutrition and digestive physiology, anatomy, meat science, animal classification, current issues and overviews of the dairy, poultry, equine, beef, sheep, swine, and aquaculture industries. Opportunity is provided for students to earn three (3) hours of introductory college credit. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
1.1, 2.5, 2.20, 6.1, 6.2, 6.3	Students will <ul style="list-style-type: none"> • Explain the domestication of livestock species and the subsequent impacts of human actions on these animal species.
1.1, 2.2, 2.3, 2.5, 2.7, 2.13, 2.18, 2.19, 2.20, 4.5 6.1, 6.2, 6.3	<ul style="list-style-type: none"> • Describe the national and international livestock industries including major producers, trends over time, economic importance, contributions to humanity and essential components.
1.1, 1.10, 1.11, 2.1, 5.1, 6.1, 6.2, 6.3	<ul style="list-style-type: none"> • Classify livestock using taxonomy, breed, purity, and market characteristics and be able to discuss the origin of the various classes.
2.5, 2.13, 5.1, 5.4, 5.5, 6.1, 6.2, 6.3	<ul style="list-style-type: none"> • Explain the genetic basis of heredity and discuss the manipulation of that system in the creation of improved livestock.
2.3, 2.5, 6.1, 6.2, 6.3	<ul style="list-style-type: none"> • Describe the growth and development of mammalian and avian livestock species from conception through birth or hatching, including sex cells, embryonic, and fetal stages.
2.2, 2.3, 6.2, 6.2, 6.3	<ul style="list-style-type: none"> • Diagram the male and female mammalian reproductive tracts and discuss the processes of gametogenesis, fertilization, gestation, parturition and lactation.

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2.3, 2.4, 6.1, 6.2, 6.3	<ul style="list-style-type: none"> Diagram the various digestive systems of livestock species and explain the major fermentative and biochemical processes which occur there and support all bodily functions.
2.7, 2.8, 2.29, 5.1, 5.4, 6.1, 6.2, 6.3	<ul style="list-style-type: none"> Define nutrient, list the nutrient groups, explain their functions and explain how feeds are balanced to meet nutrient requirements of animals.
2.2, 6.1, 6.2, 6.3	<ul style="list-style-type: none"> Discuss the creation of meat and dairy products from livestock, including the natural and fermentative processes involved.
2.2, 2.3, 2.5, 6.1, 6.2, 6.3	<ul style="list-style-type: none"> Describe the aquaculture industry, including nutrient and carbon dioxide management, cultural systems, and important species.
2.5, 2.13, 2.19, 2.20, 4.6, 5.1, 6.1, 6.2, 6.3	<ul style="list-style-type: none"> Differentiate among the beef, dairy, swine, sheep, equine, poultry and aquaculture industries, including management practices, production systems, end products and major regions of production in the U.S. and the world.
1.11, 2.13, 2.18	<ul style="list-style-type: none"> maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37	<ul style="list-style-type: none"> utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	<ul style="list-style-type: none"> apply science, math and communication skills within the technical content.
Connections	
<ul style="list-style-type: none"> Kentucky Occupational Skill Standards Secretary's Commission on Achieving Necessary Skills (SCANS) National Council for Agriculture Education Skill Standards in Bio-Technology 	

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Course Description: A college-freshman level course which surveys genetics, reproductive physiology, growth and development, nutrition and digestive physiology, anatomy, meat science, animal classification, current issues, and careers and overviews of the dairy, beef, sheep, swine, equine, poultry, and aquaculture industries. Opportunity is provided for students to earn three (3) hours of introductory college credit. Content may be enhanced by using appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations:

- 1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems
- 1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems
- 1.10 Students organize information through development and use of classification rules and systems
- 1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes
- 1.12 Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes
- 2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems
- 2.2 Student identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events
- 2.3 Student identify and analyze systems and the ways their components work together or affect each other
- 2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed
- 2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance
- 2.7. Students understand number concepts and use numbers appropriately and accurately
- 2.8 Students understand various mathematical procedures and use them appropriately and accurately
- 2.13 Students understand and appropriately use statistics and probability
- 2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups
- 2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living
- 2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations
- 2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective
- 2.29 Students demonstrate skills that promote individual well-being and healthy family relationships
- 2.36 Students use strategies for choosing and preparing for a career
- 2.37 Students demonstrate skills and work habits that lead to success in future schooling and work
- 2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job
- 4.5 Students demonstrate an understanding of, appreciation for, and sensitivity to a multicultural and world view

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- 4.6 Students demonstrate an open mind to alternative perspectives
- 5.1 Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real-life situations
- 5.4 Students use a decision-making process to make informed decisions among options
- 5.5 Students use problem-solving processes to develop solutions to relatively complex problems
- 6.1 Students connect knowledge and experiences from different subject areas
- 6.2 Students use what they already know to acquire new knowledge, develop new skills, or interpret new experiences
- 6.3 Students expand their understanding of existing knowledge by making connections with new knowledge, skills, and experiences

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Skills Standards:

- OA001 Apply principles of livestock nutrition
- OA002 Apply principles of health management
- OA003 Utilize appropriate livestock selection techniques
- OA004 Understand principles of reproductive physiology and utilization of appropriate technology (synchronization, artificial insemination, embryo transfer)
- OC002 Interpret the input of local, state, national, and international economy to production agriculture
- OE005 Demonstrate knowledge of specialty agriculture markets
- OF004 Formulate and evaluate rations
- OH002 Recognize common plant and animal diseases
- OH003 Apply appropriate prevention techniques and treatments of plant and animal diseases
- OH004 Utilize understanding of plant and animal nutrition in the management and prevention of diseases
- OH005 Utilize understanding of varieties and breeds in the management and prevention of diseases
- OH006 Understand agriculture's relationship and responsibility to guarantee a safe food supply and a healthy environment
- OI001 Utilize appropriate production techniques for livestock
- OJ002 Identify and follow emergency, safety, and health rules/procedures
- OK003 Identify related government agencies, their functions, and their programs' effects as they relate to the farm
- OL003 Use appropriate agricultural terminology
- OL004 Identify the anatomical parts of domestic livestock
- OL005 Demonstrate knowledge of livestock breeds
- OL006 Demonstrate knowledge of the livestock carcass
- OL007 Recognize livestock pests
- AA001 Read and process information and follow instructions
- AA002 Read material and describe concepts
- AB002 Apply basic math functions to solve problems
- AB008 Calculate with percents, rate, ratio, and proportion with the use of a calculator

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- | | |
|-------|---|
| AC001 | Understand scientific plant and animal classification |
| AC002 | Compare the anatomical parts and distinguishing characteristics of plants and animals |
| AC003 | Understand the reproductive processes of plant and animals |
| AC004 | Analyze the process of plant and animal growth and development |
| AC005 | Be aware of biotechnology and its uses in production agriculture |
| AC006 | Explain the use of applied genetics in plants and animals |

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Core Content:

- SC-H-1.3.1 Chemical reactions occur all around us and in every cell in our bodies. These reactions may release or consume energy
- SC-H-1.3.2 Rates of chemical reactions vary. Reaction rates depend on concentration, temperature, and properties of reactants. Catalysts speed up chemical reactions.
- SC-H-2.2.1 Earth is a system containing essentially a fixed amount of each stable chemical atom or element. Each element can exist in several different reservoirs. Each element on Earth moves among reservoirs in the solid Earth, oceans, atmosphere, and organisms as part of geochemical cycles.
- SC-H-2.2.2 Movement of matter between reservoirs is driven by Earth's internal and external sources of energy. These movements are often accompanied by a change in physical and chemical properties of the matter. Carbon, for example, occurs in carbonate rocks such as limestone, in the atmosphere as carbon dioxide gas, in water as dissolve carbon dioxide, and in all organisms as complex molecules that control the chemistry of life.
- SC-H-3.1.2 Most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by a large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell.
- SC-H-3.1.3 Cells store and use information to guide their functions. The genetic information stored in DNA directs the synthesis of the thousands of proteins that each cell requires.
- SC-H-3.1.4 Cell functions are regulated. Regulation occurs both through changes in the activity of the functions performed by proteins and through selective expression of individual genes. This regulation allows cells to respond to their internal and external environments and to control and coordinate cell growth and division.
- SC-H-3.1.6 In the development of multicellular organisms, cells multiply and differentiate to form many specialized cells, tissues, and organs. This differentiation is regulated through the expression of different genes.

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- SC-H-3.2.2 Behavioral responses to internal changes and external stimuli can be innate or learned. Responses to external stimuli can result from interactions with the organism's own species and/or other species, as well as environmental changes.
- SC-H-3.3.1 In all organisms and viruses, the instructions for specifying the characteristics are carried in nucleic acids. The chemical and structural properties of nucleic acids determine how the genetic information that underlies heredity is both encoded in genes and replicated.
- SC-H-3.3.2 Multicellular organisms, including humans, form from cells that contain two copies of each chromosome. This explains many features of heredity. Transmission of genetic information through sexual reproduction to offspring occurs when male and female gametes that contain only one representative from each chromosome pair unite.
- SC-H-3.3.3 Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring.
- SC-H-3.4.3 Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships. Species is the most fundamental unit of classification. Different species are classified by the comparison and analysis of their internal and external structures and the similarity of the chemical processes.
- SC-H-3.5.2 Energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers.
- SC-H-3.5.3 Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.
- SC-H-3.5.5 Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected.
- SC-H-3.6.1 Living systems require a continuous input of energy to maintain their chemical and physical organization since the universal tendency is toward more disorganized states. The energy for life primarily derives from the Sun. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing molecules. These molecules can be used to assemble larger molecules (e.g., DNA, proteins, sugars, fats). In addition, the energy stored in the bonds between the atoms can be used as sources of energy for life processes.

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- SC-H-3.6.2 The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Cells usually store this energy temporarily in the phosphate bonds of ATP. During the process of cellular respiration, some energy is lost as heat.
- SC-H-3.6.3 As matter and energy flow through different organizational levels (e.g., cells, organs, organisms, communities) and between living systems and the physical environment, chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change.

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SCANS:

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Content/process statements	Core content	Academic Expectations	Skills Standards	SCANS
Explain the domestication of livestock species and the subsequent impacts of human actions on these animal species	SC-H-3.5.5	1.1, 2.5, 2.20, 6.1, 6.2, 6.3	AA002,	
Describe the national and international livestock industries including major producers, trends over time, economic importance, contributions to humanity, and essential components	SC-H-3.5.5	1.1, 2.2, 2.3, 2.5, 2.7, 2.13, 2.18, 2.19, 2.20, 4.5, 6.1, 6.2, 6.3	OC002, OH006, OK003, OL003, AA002,	
Classify livestock using taxonomy, breed, purity, and market characteristics and be able to discuss the origin of the various species	SC-H-3.3.3 SC-H-3.4.3	1.1, 1.10, 1.11, 2.1, 5.1, 6.1, 6.2, 6.3	OH005, OL003, OL004, OL005, AA002, AC001, AC002	
Explain the genetic basis of heredity and discuss the manipulation of that system in the creation of improved livestock	SC-H-3.1.3 SC-H-3.1.4 SC-H-3.1.6 SC-H-3.3.1 SC-H-3.3.2 SC-H-3.3.3	2.5, 2.13, 5.1, 5.4, 5.5, 6.1, 6.2, 6.3	OL003, AA001, AA002, AB008, AC005, AC006	
Describe the growth and development of mammalian and avian livestock species from conception through birth or hatching, including sex cells, embryonic, and fetal stages	SC-H-3.1.3 SC-H-3.1.4 SC-H-3.1.6 SC-H-3.3.2	2.3, 2.5, 6.1, 6.2, 6.3	OA004, OL003, OL004, AA002, AC002, AC003, AC004, AC005, AC006	
Diagram the male and female mammalian reproductive tracts and discuss the processes of gametogenesis, fertilization, gestation, parturition, and lactation	SC-H-3.3.2	2.2, 2.3, 6.1, 6.2, 6.3	OA004, OL003, OL004, AA002, AC002, AC003	

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Diagram the various digestive systems of livestock species and explain the major fermentative and biochemical processes which occur there and support all bodily functions	SC-H-1.3.1 SC-H-3.1.2 SC-H-3.5.3 SC-H-3.6.1 SC-H-3.6.2 SC-H-3.6.3	2.3, 2.4, 6.1, 6.2, 6.3	OA001, OH004, OL003, OL004, AA002, AC002	
Define nutrient, list the nutrient groups, explain their functions and sources, and explain how feeds are balanced to meet nutrient requirements of animals	SC-H-3.1.2 SC-H-3.6.1 SC-H-3.6.2 SC-H-3.6.3	2.7, 2.8, 2.29, 5.1, 5.4, 6.1, 6.2, 6.3	OA001, OF004, OH004, OL003, AA001, AA002, AB002, AB008,	
Discuss the creation of meat and dairy products from livestock, including the biochemical and fermentative processes involved	SC-H-1.3.1 SC-H-3.1.2	2.2, 6.1, 6.2, 6.3	OA002, OI001, OJ002, OK003, OL003, OL004, OL006, AA002, AC002	
Describe the aquaculture industry, including nutrient and carbon dioxide management, cultural systems, and important species	SC-H-2.2.1 SC-H-2.2.2 SC-H-3.6.1 SC-H-3.6.3	2.2, 2.3, 2.5, 6.1, 6.2, 6.3	OA001. OE005, OL003, OL004, AA002,	
Differentiate among the beef, dairy, swine sheep, equine, poultry, and aquaculture industries, including management practices, production systems, end products, and major regions of production the US and world	SC-H-3.2.2 SC-H-3.4.3 SC-H-3.5.2 SC-H-3.5.5	2.5, 2.13, 2.19, 2.20, 4.6, 5.1, 6.1, 6.2, 6.3	OA001, OA002, OA003, OA004, OC002, OF004, OH002, OH003, OH004, OH005, OH006, OI001, OL003, OL004, OL005, OL006, OL007, AA001, AA002, AC002, AC003, AC004, AC005, AC006	

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<p>Course Description: A freshman college-level course which introduces students to the world of plants. The course is a survey of botany, agronomy, horticulture, soils, forestry, and other areas of plant science. Opportunity is provided for students to earn three (3) hours of introductory college credit.</p> <p>Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.</p>	
Academic Expectations	Content/Process
1.1,1.10,2.2,2.6	<p>Students will</p> <ul style="list-style-type: none"> • discuss evolution and the classification of plants • explain the significance of plant science to fulfill basic human needs. • differentiate between sexual and asexual plant propagation and reproduction. • assess the environmental factors affecting plant growth and development. • determine plant processes such as photosynthesis, respiration, and other processes. • relate genetic processes to plant breeding and crop production. • examine the plant cell and its related structures. • explain seed germination and life cycles. • summarize the physical and chemical properties of soil and other plant growing media. • relate harvest and post harvest processes to various plants.
2.19,2.20,2.36	
2.2,2.3,2.4,2.6	
2.1,2.2,2.3,2.5	
2.1,2.2,2.3,2.4	
2.2,2.3,2.4,2.5	
2.2,2.3,2.4,2.5	
2.2,2.3,2.4,2.5	
2.2,2.4,2.6	
2.2,2.3,2.4,2.5	
2.2,2.3,2.4,2.5	

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2.2,2.3,2.4,2.5	• appraise plant pest control and management.
2.2,2.3,2.4,2.5	• review plant ecosystems and sustainability
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
Connections	
• Kentucky Occupational Skill Standards	
• Secretary's Commission on Achieving Necessary Skills (SCANS)	
• National Council for Agriculture Education Skill Standards in Bio-Technology	

Course Description:

A college –freshman level course which introduces students to the world of plants. The course is a survey of botany, agronomy, horticulture, soils, forestry, and other areas of plant science. Opportunity is provided for students to earn three (3) hours of introductory college credit. Contents may be enhanced by using appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations:

- 1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.

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- 1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems.
- 1.10 Students organize information through development and use of classification rules and systems.
- 1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.
- 1.12 Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.
- 2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.
- 2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.
- 2.3 Students identify and analyze systems and the ways their components work together or affect each other.
- 2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.
- 2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance.
- 2.6 Students understand how living and nonliving things change over time and the factors that influence the changes.
- 2.13 Students understand and appropriately use statistics and probability.
- 2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.
- 2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.
- 2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.
- 2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.
- 2.36 Students use strategies for choosing and preparing for a career.
- 2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
- 2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other post-secondary training or to get a job.

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Skills Standards:

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ED001	Organize materials with a logical flow.
ED002	Interpret and clarify directions prepared by others.
EE001	Apply a system of problem solving.
AA001	Read and process information and follow instructions.
AA002	Read material and describe concepts.
AA003	Use correct terminology.
AA004	Use correct spelling, grammar and punctuation.
AA005	Write with accuracy, brevity, and clarity.
AA008	Demonstrate understanding of basic of interpersonal communication (listening, written, oral, etc.).
AA009	Implement new process steps given oral instructions.
AA015	Demonstrate good speaking and presentation characteristics.
AA016	Demonstrate basic leadership skills.
AB002	Apply basic math functions to solve problems.
AB006	Document results of measurement activities and calculations
AB007	Calculate with percents, rate, ratio, and proportion with the use of a calculator.
AC001	Understand scientific plant classification.
AC002	Compare the anatomical parts and distinguishing characteristics of plants.
AC003	Understand the reproductive processes of plants.
AC004	Investigate sexual and asexual reproduction of plants including tissue culture.
AC005	Analyze the process of plant growth and development.
AC006	Be aware of biotechnology and its uses in horticulture production.
AC007	Explain the use of applied genetics in plants.

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Core Content:

Students will:

- discuss evolution and the classifications of plants
- examine plant cells and its related structures
- explain seed germination and life cycles
- explain the significance of plant science to fulfill basic human needs
- differentiate between sexual and asexual plant propagation and reproduction
- assess the environmental factors affecting plant growth and development
- determine plant processes such as photosynthesis, respiration, and other processes
- relate genetic processes to plant breeding and crop production
- summarize the physical and chemical properties of soil and other plant growing media
- relate harvest and post harvest processes to various plants
- appraise plant pest control and management
- review plant ecosystems and sustainability
- demonstrate employability and social skills relative to the career cluster
- maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions
- utilize activities of FFA as an integral component of course content and leadership development

Science Core Content:

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Grades 8 through 11 with Assessment at Grade 11-Life Science

The Cell

- SC-H-3.1.1** Cells have particular structures that underlie their function. Every cell is surrounded by a membrane that separates it from the outside world. Inside the cell is a concentrated mixture of thousands of different molecules that form a variety of specialized structures. These structures carry out specific cell functions.
- SC-H-3.1.2** Most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by a large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell.
- SC-H-3.1.3** Cells store and use information to guide their functions. The genetic information stored in DNA directs the synthesis of the thousands of proteins that each cell requires.
- SC-H-3.1.4** Cell functions are regulated. Regulation occurs both through changes in the activity of the functions performed by proteins and through selective expression of individual genes. This regulation allows cells to respond to their internal and external environments and to control and coordinate cell growth and division.
- SC-H-3.1.5** Plant cells contain chloroplasts, the site of photosynthesis. Plants and many microorganisms (e.g., *Euglena*) use solar energy to combine molecules of carbon dioxide and water into complex, energy-rich organic compounds and release oxygen to the environment. This process of photosynthesis provides a vital link between the Sun and energy needs of living systems.
- SC-H-3.1.6** In the development of multicellular organisms, cells multiply and differentiate to form many specialized cells, tissues, and organs. This differentiation is regulated through the expression of different genes.

The Molecular Basis of Heredity

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- SC-H-3.3.1** In all organisms and viruses, the instructions for specifying the characteristics are carried in nucleic acids. The chemical and structural properties of nucleic acids determine how the genetic information that underlies heredity is both encoded in genes and replicated.
- SC-H-3.3.2** Multicellular organisms, including humans, form from cells that contain two copies of each chromosome. This explains many features of heredity. Transmission of genetic information through sexual reproduction to offspring occurs when male and female gametes that contain only one representative from each chromosome pair unite.
- SC-H-3.3.3** Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring.

Biological Change

- SC-H-3.4.1** Species change over time. Biological change over time is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) natural selection. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms.
- SC-H-3.4.2** The great diversity of organisms is the result of more than 3.5 billion years of biological change over time that has filled every available niche with life forms. The millions of different species of plants, animals, and microorganisms that live on Earth today are related by descent from common ancestors.
- SC-H-3.4.3** Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships. Species is the most fundamental unit of classification. Different species are classified by the comparison and analysis of their internal and external structures and the similarity of their chemical processes.

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The Interdependence of Organisms

- SC-H-3.5.1 Atoms (e.g., carbon, nitrogen) and molecules (e.g., water) cycle among the living and nonliving components of the biosphere.
- SC-H-3.5.2 Energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers.
- SC-H-3.5.3 Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.
- SC-H-3.5.5 Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected.

Matter, Energy, and Organization in Living Systems

- SC-H-3.6.1 Living systems require a continuous input of energy to maintain their chemical and physical organization since the universal tendency is toward more disorganized states. The energy for life primarily derives from the Sun. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing molecules. These molecules can be used to assemble larger molecules (e.g., DNA, proteins, sugars, fats). In addition, the energy stored in the bonds between the atoms can be used as sources of energy for life processes.
- SC-H-3.6.2 The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Cells usually store this energy temporarily in the phosphate bonds of ATP. During the process of cellular respiration, some energy is lost as heat.

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SC-H-3.6.3 As matter and energy flow through different organizational levels (e.g., cells, organs, organisms, communities) and between living systems and the physical environment, chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change.

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SCANS:

- C2 Money – Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
- C3 Material and Facilities – Acquires, stores, allocates, and uses materials or space efficiently.
- C5 Acquires and evaluates information.
- C6 Organizes and maintains information.
- C7 Interprets and communicates information.
- C8 Uses computers to process information.
- C9 Participates – Contributes to group effort.
- C10 Teaches Others.
- C11 Serves Clients/Customers – Works to satisfy customers' expectations.
- C12 Exercise Leadership – Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
- C15 Understands Systems – Knows how social, organizational, and technological systems work and operates effectively with them.
- C16 Monitors and Corrects Performance –Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
- C18 Selects Technology – Chooses procedures, tools or equipment including computers and related technologies.
- C19 Applies Technology to Task – Understands overall intent and proper procedure for setup and operation of equipment.
- C20 Maintains and Troubleshoots Technology - Prevents, identifies, or solves problems with equipment, including computers and other technologies.
- F1 Reading – Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
- F2 Writing – Communicates thoughts, ideas, information, and messages in writing; and relates documents such as letters, directions, manuals, reports, graphs, and flow charts.
- F3 Arithmetic – Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.

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- F4 Mathematics – Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
- F5 Listening – Receives, attends to, interprets, and responds to verbal messages and other cues.
- F6 Speaking – Organizes ideas and communicates orally.
- F7 Creative Thinking – Generates new ideas.
- F8 Decision Making – Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
- F9 Problem Solving – Recognizes problems and devises and implements plan of action.
- F11 Knowing How to Learn – Uses efficient learning techniques to acquire and apply new knowledge and skills.
- F12 Reasoning – Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.
- F13 Responsibility – Exerts a high level of effort and perseveres towards goal attainment.
- F14 Self-Esteem – Believes in own self-worth and maintains a positive view of self.
- F15 Sociability – Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.
- F16 Self-Management – Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
- F17 Integrity/Honestly – Chooses ethical courses of action.

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Technical Content	Academic Expectations	Science Core Content: Life Science	Skill Standards	SCA
discuss evolution and the classifications of plants	1.1, 1.2, 1.10, 2.2, 2.6, 5.3	SC-H-3.4.1, SC-H-3.4.3	ED001, EE001, AA001, AA002, AA003, AC001,	F1, F17,
examine plant cells and its related structures	1.1, 1.2, 2.2 2.3, 2.4, 2.5	SC-H-3.1.1, SC-H-3.1.3, SC-H-3.1.4, SC-H-3.1.5	AA001, AA002, AA003, AC002	C7, C
explain seed germination and life cycles	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6	SC-H-3.5.1, SC-H-3.5.2, SC-H-3.5.3, SC-H-3.5.5	AA001, AA002, AA003, AC003, AC004, AC005	C5, C F12
explain the significance of plant science to fulfill basic human needs	2.19. 2.20, 2.36	SC-H-3.5.5, SC-H-3.6.1	AC007	C7, C
differentiate between sexual and asexual plant propagation and reproduction	2.2, 2.3, 2.4, 2.6	SC-H-3.3.1, SC-H-3.3.2, SC-H-3.3.2, SC-H-3.4.1,	AC004, OC001	C5, C F16
assess the environmental factors affecting plant growth and development	1.3, 2.1, 2.2, 2.3, 2.5	SC-H-3.5.1, SC-H-3.5.2, SC-H-3.5.3, SC-H-3.5.5	OD002, EA007, EE001	C5, C C19, F12,

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determine plant processes such as photosynthesis respiration, and other processes	2.1, 2.2, 2.3, 2.4	SC-H-3.1.2, SC-H-3.1.5, SC-H-3.1.6, SC-H-3.3.1 SC-H-3.3.2, SC-H-3.3.3 SC-H-3.6.1, SC-H-3.6.2	OD002, AC003, AC005	C5, C8, F8, F11, F17
relate genetic processes to plant breeding and crop production	2.2, 2.3, 2.4, 2.5	SC-H-3.3.1, SC-H-3.3.2, SC-H-3.3.3	AC006, AC007	C5, C8, F8, F11, F17
summarize the physical and chemical properties of soil and other plant growing media	2.2, 2.4, 2.6	SC-H-3.5.1, SC-H-3.5.2, SC-H-3.5.3, SC-H-3.5.5	OB001, OB002, OB003, OB004, OB006	C5, C8, F8, F11, F17
relate harvest and post harvest processes to various plants	2.2, 2.3, 2.4, 2.5		OD003, AC006	C5, C8, F8, F11, F17
appraise plant pest control and management	2.2, 2.3, 2.4, 2.5		OE001, OE002, OE003, OE004	C3, C5, C8, C20, F17
review plant ecosystems and sustainability	2.2, 2.3, 2.4, 2.5	SC-H-3.5.1, SC-H-3.5.2, SC-H-3.5.3, SC-H-3.5.5, SC-H-3.6.3	AC005	C5, C8, F8, F11, F17
demonstrate employability and social skills relative to the career cluster	1.1, 2.36, 2.38		OA002, OA003, OG003, OG004, OG005, OG006, OG007, OG009, OG0010, OH003, EA001, EA002, EA003, EA004, EA005, EA006, EA011, EA012, EA013	C5, C8, C15, F2, F8, F11, F17

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maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions	1.11, 2.13, 2.18		EC002, EC003, EC004, EC009, AB006, AB008	C2, C F12,
utilize activities of FFA as an integral component of course content and leadership development	1.12, 2.16, 2.37		ED006, AA010, AA011, AA012, AA013, AA014, AA015, AA016	C6, C F13,